THE BRITISH ASSOCIATION AND LOCAL SCIENTIFIC SOCIETIES.

THE fourth Annual Conference of Delegates of Corresponding Societies was held during the Bath meeting of the Association, thirty-eight local Societies having nominated representatives. The following is an abstract of the Report which has recently been issued by the Corresponding Societies Committee:—

At the first meeting the chair was taken by Dr. John Evans, Treasurer R.S., the Corresponding Societies Committee being represented by General Pitt-Rivers, Sir Douglas Galton, Prof. Boyd Dawkins, Prof. T. G. Bonney, Mr. W. Whitaker, Mr. G. J. Symons, Mr. W. Topley, Dr. Garson, Mr. J. Hopkinson, Mr. W. White, and Prof. R. Meldola, Secretary.

The delegates were invited to make any statements respecting the work done by the Committees appointed last year, or in connection with other subjects referred to in the Report which had been presented to the General Committee.

A discussion took place with reference to the working of the Ancient Monuments Act, in which the Deemster Gill, Prof. Boyd Dawkins, Dr. Evans, General Pitt-Rivers, Sir John Lubbock, and many of the delegates took part. The issue of greatest importance, so far as concerns the local Societies, is that these bodies should take upon themselves the responsibility of protecting, as far as possible, the ancient remains in their own districts.

Earth Tremors Committee.—Prof. Lebour reported that the Committee was about to apply for reappointment, with the object of, in the first place, prosecuting inquiries as to the best form of instruments, and the best conditions with respect to locality, foundation, &c., for fixing up such instruments. Several Societies and individuals had expressed their willingness to co-operate as soon as these conditions had been determined, and the Birmingham Philosophical Society had made a grant towards the expenses of these preliminary trials.

Prof. Lebour stated also that the North of England Institute of Mining and Mechanical Engineers had recently appointed a Committee, armed with a substantial grant, to make a series of experiments on so-called "flameless explosives." This Committee was now at work, and would gladly receive assistance in any way from kindred Societies. The same Institute had joined with the Mining Institutes of South Wales and Scotland in forming another Committee to conduct a series of experiments on fan-ventilation. He thought that these were examples of the kind of co-operation which the Conference of Delegates of Corresponding Societies was likely to bring about.

At the second meeting of the Conference, the chair was first taken by the Secretary, Prof. R. Meldola, and afterwards by the Vice-Chairman, Mr. W. Whitaker, the Committee being further represented by Mr. J. Hopkinson and Mr. W. White, and towards the close of the meeting by Dr. Evans, who had been detained at the Committee of Recommendations.

The Chairman, in opening the proceedings, said that it would be best to adopt their usual plan, and consider the suggestions and recommendations from the different Sections in their proper sequence.

SECTION A.

Temperature Variation in Lakes, Rivers, and Estuaries.—Dr. Mill said that he wished to point out some of the results that had been obtained by the Committee appointed to make the investigations in conjunction with the local Societies represented in the Association. He had a diagram which showed the work done more precisely than he could explain in a short time. The Committee had twenty observers working at various rivers; most of these rivers were in Scotland, only one or two being in England, while no observations had been started in Ireland. Their investigations showed that while in some rivers, particularly the Aray, the temperature was increased by rainfall, in others this condition was reversed, the temperature being found to suddenly fall during rain. He wished to impress upon the delegates the advisability of extending their observations throughout Scotland and England, and also of extending them to Ireland. Prof. Fitzgerald, the President of Section A, who was a member of the Committee, took a great interest in the subject, and had expressed an opinion that Mr. Symons's rain-gauge observers might make personal observations. Dr. Mill advised all observers to use the thermometer which he exhibited, and which he said was durable and cheap. He trusted that delegates on returning home would lay the subject before their Societies, give them some idea of the work of the Committee, and induce them to co-operate and make observations in their respective localities. Circulars, he added, would be sent to the Societies and to Mr. Symons's rain-gauge observers, and it was hoped that this would bring the question well before them. It would give local Societies an opportunity of doing what they professed to do, and he was perfectly certain they were anxious to promote real scientific work. The observations could be made with very little training, and the investigations of conscientious observers would lead to interesting results, as they would be considered by the Committee in connection with the temperature and rainfall of the districts in which they were made.

In reply to questions by Mr. Cushing and the Rev. E. P. Knubley, Dr. Mill said that the thermometer readings were taken at a depth of 6 inches below the surface of the water, and that the fullest particulars would be supplied by the Committee to any Society wishing to take part in the observations.

SECTION C.

Prof. Lebour, who had been nominated as the representative of the Committee of this Section, said that the Committees on (1) Sea-coast Erosion, (2) Underground Waters, (3) Erratic Blocks, and (4) Earth Tremors, the working of which had been explained to the delegates on former occasions, had been recommended for reappointment.

Geological Photography.—Prof. Lebour further informed the delegates that, in consequence of a paper read before Section C by Mr. O. W. Jeffs on local geological photographs, it was proposed by the Committee of the Section that a Committee should be appointed to collect and register such photographs. The proposal at present was so indefinite that there was no chance of the Committee of Recommendations dealing with it this year, but they gave the suggestion their cordial sympathy, and it was formally passed on to the meeting of delegates. It was hoped that delegates of Corresponding Societies, by discussing the matter among themselves, would have it so organized and ready to place before the Committee of the Section next year, and ultimately before the Committee of Recommendations, in such a form that a Committee of the Association might be appointed, with a small grant, to work the scheme satisfactorily. It was thought by the Committee of the Section that too many restrictions as to the uniformity of the photographs should not be enforced in the early stages of the scheme. The simple collection and registration of photographs was all that was at present aimed at.

The following suggestions with reference to this subject were forwarded by the Committee of the Section to the Secretary of the Conference:—

"(1) That a Committee be formed, having representatives for each county, charged with the arrangement of a local photographic survey for geological purposes in each district.

"(2) The Committee will gather together—

"(*a*) Names of Societies and individuals who have already assisted in this object, or who are willing to do so;

"(*b*) Copies of geological photographs already taken;

"(*c*) List of localities, sections of rocks, boulders, and other features desirable to be photographed;

and will arrange with local Societies for the work to be done as may be convenient or possible.

"(3) Each photograph to be accompanied by the following particulars:—

"(*a*) Name and position of locality or section;[1]

"(*b*) Details of features shown (with illustrative diagram or sketch whenever necessary for such explanation);

"(*c*) Scale of height and length, or figure introduced to indicate size in Nature;

"(*d*) Name of photographer and Society under whose direction the view is taken;

"(*e*) Date when photographed.

"(4) Size of photograph recommended: 12 × 10 inches (whole plate), but this is not compulsory.

"(5) Original negative to be the property of the Society or individual under whose direction it is taken, and who shall also fix a price at which copies may be sold.

"(6) One copy of each photograph to be the property of the British Association, and one other copy to be given to the Geological Society of London.

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[1] Including Compass Direction.—*Sec. Corr. Soc. Comm.*

"(7) Each photograph officially received to be numbered and recorded in a reference-book, and a list published and circulated showing price at which members and others may purchase them.

"(8) A circular to be issued to all geological Societies, inviting their co-operation."

Mr. Jeffs said that a large number of Societies in different parts of the Kingdom had taken, from time to time, photographs of various geological sections and features as they came under their notice, but there had been no systematic way adopted either of collecting the photographs or of recording them, so that geologists interested might really know what had been taken. He thought that, if some arrangement could be made, a great deal of good might be done not only for the benefit of geological science, but also for educational purposes. Regarding regulations, he was not desirous of laying down any strict rules, but he thought that if the scheme were to be carried out at all satisfactorily, and at a minimum expenditure, some few regulations would be necessary.

Mr. Whitaker thought it a very fit subject for the Conference, and trusted that delegates would get their Societies to think it over. The object was to interest all the Societies, and to have a harmonious result.

Some further discussion took place with reference to the requirements of the proposed Committee and the mode of procedure in the field, in the course of which it was pointed out that the chief object was to secure photographs of typical and especially of *temporary* sections. The details of manipulation, the size of the photographs, method of mounting, registration of scale, &c., could only be settled when the Corresponding Societies had taken action in the matter, and the Committee had been formally appointed.

SECTION D.

The Committee of this Section was represented by Prof. Hillhouse.

Life-histories of Native Plants.—Prof. Meldola said that since their last meeting at Manchester, Prof. Bayley Balfour had received several applications for further particulars with reference to the suggestion which he communicated to last year's Conference. Prof. Balfour was unable to be present at Bath, but had forwarded the following:—

"*Suggestions for those studying the Life-histories of British Flowering Plants*:—

"(1) Seeds should be collected, and opportunity may be taken at the time of collection to note how they are disseminated in Nature—whether the fruit opens or not, whether they have appendages for promoting transport by animals or otherwise, whether they have colour or other features of attraction, &c.

"(2) The seeds being sown, their germination should be watched; its rapidity and manner noted. The variations and differences between albuminous and exalbuminous seeds are worthy of special note. The movements of the parts of the embryo in germination until it acquires its fixed position are also deserving of study. Further, the form of the parts of the embryo is various and instructive.

"(3) The development of the seedling into the adult can be readily watched in annuals and biennials, and smaller perennials. The succession of leaves after the cotyledons should be noted, and the forms which the leaves assume, and their positions and spread. The relative succession of buds in or adjacent to the axils of the later leaves and of the cotyledons should be observed, as also the ultimate fate of the buds developed. This will give a clue to the branching of the main axis of the plant, upon which its whole form and habit depend.

"(4) An important point to look at in the development is the amount, character, and position of any clothing of hairs the seedling may possess.

"(5) The development of the underground part of the seedling must not be neglected. The continuance of the primary root and its branching or its replacement by adventitious roots are points for particular attention, and also the formation upon it of any excrescence or buds. A sufficient number of seedlings must be grown to allow of proper study of these features.

"(6) The form of branching of the stem and leaves may be studied in the mature plant, which may be gathered wild. The formation of false axes should be specially looked for, and the complex relations often resulting from branching may be worked out upon the young top of a mature plant. It is not necessary to wait for the maturing of the seedling, but reference back to the seedling will show whether any observed relations are of late or early development in the life-history.

"(7) In the case of perennials, the mode of perennation is an interesting feature for observation, as well as the methods of vegetative propagation. In some cases the two processes are merged in one. Properly to understand perennation the perennating portions must be examined at all periods of the resting season as well as when they are starting anew into vegetative activity. Seedlings of perennating plants watched during two or three seasons will give a clue towards elucidation of the development.

"(8) When the seedlings begin to form flowers, the relation of the flower-shoots to the vegetative organs should be noted, and especially their sequence with reference to vegetative shoots. The succession of the flowers should be noted, as of course should be their structure and their adaptations to proper pollination. Many seedlings will not, of course, flower for years, and the sequence of flowers in such plants, and, indeed, in all cases, may be well traced in the mature plant growing wild.

"(9) After flowering and pollination the development of fruit must be studied. The parts concerned in forming fruit, the adaptations to scattering of the fruit or seed are points to be precisely noted.

"(10) The presence and position of any nectar-secreting structures outside as well as inside the flower are of much significance, and they should be carefully studied.

"(11) In connection with every point observed of structure and development the observer should ask himself, Why is this? What is this for? and endeavour to obtain some answer to the query.

"(12) A series of observations upon a specific plant made by a careful observer will enable him or her to draw up a complete history of its life, such as is hardly to be found recorded at the present day.

"I may add as a corollary that an interesting field for observation which local Societies might do good work in is that of the relation of plants to animals as food-plants. Some are discarded by browsing animals, others are preferred, and there are degrees of favouritism. Is there any principle of selection?"

Prof. F. O. Bower, the delegate from the Natural History Society of Glasgow, who was unable to be present at the meeting, forwarded a communication with reference to this subject, in which he pointed out that the chief precaution which would have to be observed in the carrying out of observations in accordance with Prof. Balfour's scheme, would be the correct identification of the species being worked upon.

Disappearances of Native Plants.—Prof. Hillhouse said that he was in charge of a Committee appointed two years ago for the purpose of collecting information as to the disappearance of native plants from their local habitats. Their report for 1887 said the Committee intended presenting a report in 1888 concerning its inquiries in Scotland. He came to that meeting prepared with a report, and learnt to his surprise that the Committee had lapsed, but an application had been made to the Committee of Section D to have it reappointed. He would give some brief account of their work in the past year. The report for Scotland covered eighty-five flowers which were extinct, or were "practically extinct," and they were of the most varied kinds. It had been discovered that *Nymphæa alba* (the white water-lily) had been almost exterminated in the lochs about Dumfries; the name of the person who had committed the ravages upon it was brought before the local Natural History Society, an appeal was made to the proprietors of the lochs, and the individual was warned off estates in the neighbourhood on pain of prosecution for trespass. There was one plant that had only a single station in Scotland, *Scheuchzeria palustris*, which was found in the Bog of Methven, and it had been destroyed in all probability by 300 or 400 black gulls settling in the bog and devouring everything in the shape of vegetation. Another plant which had been completely exterminated was one known as *Mertensia maritima*, which grew in shingle on the Bay of Nigg, and which had been destroyed by the shingle having been used to make concrete blocks to be used in the construction of a pier near at hand. Then a grass which grew in a patch near the Moray Frith had been destroyed by the overturning of a tree, which caused a large hole into which all the moisture of the patch drained; this grass was *Melica uniflora*. The Committee found that the disappearance of plants was caused in a great measure by the injudiciousness of individual botanists, and also by botanical exchanging clubs, who held out inducements for the collection of eighty or a hundred specimens of extremely rare varieties. The Committee hoped to present a report next year.

At the conclusion of the Conference, votes of thanks were passed to the Chairman and Secretary.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—The Sheepshanks Astronomical Exhibition at Trinity College, open to the competition of any undergraduate of the University, has been awarded to Frank Watson Dyson and Gilbert Thomas Walker, brother scholars of the College, who are declared to be equal in merit. The value of the Exhibition is 50*l.* per annum, tenable for three years, and it will be divided between the successful candidates.

SCIENTIFIC SERIALS.

American Journal of Science, December.—The invisible solar and lunar spectrum, by S. P. Langley. This paper, which is an abstract of a memoir about to appear in the publications of the United States Academy of Sciences, summarizes the result of investigations carried on at the Allegheny Observatory in continuation of the author's previous researches on the infra-red of the solar spectrum to the extent of about three microns. By means of the improved apparatus here described, the extreme infra-red solar spectrum has now been searched from three to over eighteen microns; and it is shown that in this region the ratios between solar and lunar heat are completely changed from what they are in the visible spectrum. While the solar *light* in the latter is about 500,000 times that of moonlight, the solar heat received in the invisible part of the spectrum is probably less than 500 times the lunar. These studies also promise important results for meteorology, by opening to observation the hitherto unknown region of the spectrum, in which are to be found the nocturnal and diurnal radiations, not only from the moon towards the earth, but from the soil of the earth towards space.—A brief history of Taconic ideas, by James D. Dana. The Taconic question is here treated in chronological order from 1818 till the present year, in which the controversy may be regarded as practically closed. The conclusion is now firmly established that this system is not pre-Silurian, but merely another name for the older term "Lower Silurian."—Certain generic electrical relations of alloys of platinum, by C. Barus. In this paper are given the chief results of the investigations on the measurement of high temperatures already described in vol. xxxv. p. 407, of the *Journal*. The results generally point to a limit below which, in the case of solid metals and at ordinary temperatures, neither electrical conductivity nor temperature-coefficient can be reduced. It thus appears that a lower limit of both conductivity and temperature-coefficient is among the conditions of metallic conduction, not to say of the metallic state absolutely.—On the Puget group of Washington Territory, by Charles A. White. A careful study of some fossil Mollusca from the coal-bearing formation in the Puget Sound basin, shows that they belong to a hitherto unknown brackish-water fauna, characterizing a deposit of unusual interest. A section of this formation measured at the town of Wilkeson gives a minimum thickness of no less than 13,200 feet, with a probable maximum of 14,500 feet. The surprise caused by the discovery of such an extraordinary thickness in an estuary deposit is increased by the fact that its Molluscan fauna appears to range vertically throughout the whole formation. The fauna itself seems to be of the same age, but distinct from, the Laramie, which flourished, not in an estuary, but in a land-locked basin. The area of the Puget group includes the Cascade Range, but is not otherwise yet clearly defined eastwards from the Pacific seaboard.—Papers are contributed by L. G. Eakins, on some sulphantimonites from Colorado; by A. E. Kennelly, on the voltametric measurement of alternating Currents; by Dr. C. Hart Merriman, on the fauna of the Great Smoky Mountains, with description of a new species of red-backed mouse; by W. E. Hidden and J. B. Mackintosh, on anerlite, a new thorium mineral; and by O. C. Marsh, on a new family of horned Dinosaurians (*Ceratops montanus*) recently discovered *in situ* in the Laramie deposits of the Cretaceous period, in Montana. This reptile was a very formidable animal, armed not only with horns of great strength, but with a thick dermal hide, and varying in length from 25 to 30 feet.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, December 6.—"Some Observations on the Amount of Light reflected and transmitted by certain kinds of Glass." By Sir John Conroy, Bart., M.A., Bedford Lecturer of Balliol College and Millard Lecturer of Trinity College, Oxford. Communicated by A. G. Vernon Harcourt, F.R.S.

Conclusions.—It seems probable that the amount of light reflected by freshly polished glass varies with the way in which it has been polished, and that, if a perfect surface could be obtained without altering the refractive index of the surface-layer, then the amount would be accurately given by Fresnel's formula, but that usually the amount differs from that given by the formula, being sometimes greater and sometimes less.

The formation of a film of lower refractive index on the glass would account for the defect in the reflected light; but to account for the excess, it seems necessary to assume that the polishing has increased the optical density of the surface-layer, and the changes produced in the amount of light transmitted and in the angle of polarization support this view.

After being polished, the surface of flint glass seems to alter somewhat readily, the amount of the reflected light decreasing, and the amount of the transmitted increasing, whilst with crown glass the change, if any, proceeds very slowly.

There is no evidence to show to what particular cause these changes are due.

The values of the transmission coefficients for light of mean refrangibility for the two particular kinds of glass are given, and show that for 1 cm. the loss by obstruction amounts to 2·62 per cent. with the crown glass and 1·15 per cent. with the flint glass.

Linnean Society, December 6.—Mr. W. Carruthers, F.R.S., President, in the chair.—Mr. W. H. Beeby exhibited and made some remarks on specimens of *Valeriana mikanii* and *sambucifolia*, and a series of *Potamogeton fluitans*.—Mr. F. W. Oliver described the nature and growth of leaf-emergences in *Eriospermum folioliferum*.—Mr. E. M. Holmes exhibited specimens of a new Assafœtida plant (*Ferula fœtidissima*), and a monstrosity of *Zea Mays*.—Mr. J. G. Baker exhibited a curious variety of *Vicia sepium*, found in North Yorkshire.—Mr. T. Christy exhibited specimens of an undetermined species of *Echium* received from Persia, and employed medicinally as a good alterative.—The first paper read was one by Dr. Costerus on malformation in *Fuchsia globosa*, upon which Prof. Bower offered some critical remarks.—The next paper was by Mr. B. T. Lowne, who gave an admirable demonstration of the mode of development of the egg and blastoderm of the blow-fly. His conclusions were criticized by Prof. Stewart, Prof. Howes, and Mr. A. R. Hammond.—In continuation of the Reports on the collections made by Mr. Ridley in Fernando Noronha, a paper was read on behalf of Mr. Boulenger, enumerating the fishes and reptiles which had been identified by him.

Physical Society, December 8.—Prof. Reinold, F.R.S., President, in the chair.—The following communications were read:—Note on a modification of the ordinary method of determining electro-magnetic capacity, by Dr. J. W. W. Waghorne.—On some facts connected with the systems of scientific units of measurement, by Mr. T. H. Blakesley.—Some improved polarizing apparatus for microscopes were exhibited and described by Dr. S. P. Thompson. For polarizer, he uses an Ahrens' prism, and for analyzer a flat-ended one of his own design. The Ahrens' prism is formed from a rectangular block of spar, two faces of which are perpendicular to the optic axis; two cuts parallel to the axis are made from the middle of one side to the ends of the opposite, and the cut faces are polished and cemented by Canada balsam. A short prism with wide angle is thus obtained, which can be readily fitted to the substage of the microscope. The analyzer, which consists of two wedges of spar, is mounted in a tube which fits on the eye-piece, and by recognizing that the upper end need not be larger than the pupil of the eye, the author has been able to considerably reduce the length of the prism, and still keep the bottom end large enough to collect all the rays passing through the eye-piece. Several ingenious methods of cutting spar so as to produce prisms with minimum waste were described and illustrated by models, and a "Nicol" made by the inventor at the age of 79 was exhibited. Mr. Lant Carpenter asked the author why he condemned analyzers placed directly behind the objective, for in